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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,654	12/05/2003	Michael E. Seitz	MTC 6634 1; 40-21(3584)B	8454
321	7590	01/06/2011		
SENNIGER POWERS LLP 100 NORTH BROADWAY 17TH FLOOR ST LOUIS, MO 63102				
EXAMINER				
FRAZIER, BARBARA S				
ART UNIT		PAPER NUMBER		
1611				
NOTIFICATION DATE		DELIVERY MODE		
01/06/2011		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspatents@senniger.com

Office Action Summary

Application No.

10/728,654

Applicant(s)

SEITZ ET AL.

Examiner

BARBARA FRAZIER

Art Unit

1611

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-69 and 94-99 is/are pending in the application.
- 4a) Of the above claim(s) 6-8, 10, 13-16, 37-39, 41, 44-47 and 97-99 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 9, 11, 12, 17-26, 40, 42, 43, 48-69 and 94-96 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 10/18/10
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of Claims

1. Claims 1-69 and 94-99 are pending in this application.
2. Addition of new claims 94-99 is acknowledged.
3. Applicant's election of the species wherein A) the polyisocyanate is the biuret-containing adduct of hexamethylene-1,6-diisocyanate, B) the principal amine is triethylenetetramine, C) the auxiliary amine is polyoxypropylenetriamine, and D) the pesticide is alachlor, in the reply filed on 1/10/08 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
4. Claims 6-8, 13-16, 37-39, and 44-47 remain withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 1/10/08.
5. Claims 10 and 41 have been amended to only include non-elected subject matter, specifically, wherein the auxiliary amine is an epoxy-amine adduct instead of polyoxypropylenetriamine (a polyetheramine). Accordingly, claims 10 and 41 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim.

6. Newly added claims 97-99 are directed to non-elected subject matter, specifically wherein the principal amine comprises triethylene glycol diamine (claim 97) instead of triethylenetetramine, and wherein the auxiliary amine comprises meta-xylene diamine (claim 98) or a reaction product of triethylene tetraamine and diglycidyl ether of bisphenol Z (claim 99) instead of polyoxypropylenetriamine. Accordingly, claims 97-99 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim.
7. Claims 1-5, 9, 11, 12, 17-36, 40, 42, 43, 48-69, and 94-96 are examined.

Claim Rejections - 35 USC § 112

8. Applicant's arguments, see pages 25 and 26 of Remarks filed 10/18/10, with respect to the rejection of claims 1-5, 9-12, 17-36, 40-43, and 48-69 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement have been fully considered and are persuasive. This rejection has been withdrawn.

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. **Claims 1-5, 9-12, 17-36, 40-43, 48-69, and 94-96 are rejected under 35 U.S.C. 112, first paragraph**, because the specification, while being enabling for a pesticidal material according to claim 1 wherein the principal amine is triethylene tetraamine (TETA) and the auxiliary amine is meta-xylene diamine (MXDA) in a ratio of 20:80 to

40:60, or triethylene glycol diamine:polyoxypropylenetriamine in a ratio of 60:40, and having a half-life ranging from about 5 days to about 100 days, does not reasonably provide enablement for a pesticidal material according to claim 1 having any principal amine which comprises a linear polyalkylamine or an epoxy-amine adduct, and any auxiliary amine which comprises an epoxy-amine adduct, a polyetheramine, or an amine comprising a moiety selected from the group consisting of an aryl moiety and a cycloalkyl moiety, in any amount/ratio, and having a half-life ranging from about 5 days to about 100 days, as currently claimed. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. This is a scope of enablement rejection.

To be enabling, the specification of the patent must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation. In re Wright, 999 F.2d 1557, 1561 (Fed. Cir. 1993). Explaining what is meant by "undue experimentation," the Federal Circuit has stated:

The test is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed to enable the determination of how to practice a desired embodiment of the claimed invention. PPG v. Guardian, 75 F.3d 1558, 1564 (Fed. Cir. 1996).

The factors that may be considered in determining whether a disclosure would require undue experimentation are set forth by In re Wands, 8 USPQ2d 1400 (CAFC 1988) at 1404 where the court set forth the eight factors to consider when assessing if a disclosure would have required undue experimentation. Citing Ex parte Forman, 230

USPQ 546 (BdApls 1986) at 547 the court recited eight factors:

- 1) the quantity of experimentation necessary,
- 2) the amount of direction or guidance provided,
- 3) the presence or absence of working examples,
- 4) the nature of the invention,
- 5) the state of the prior art,
- 6) the relative skill of those in the art,
- 7) the predictability of the art, and
- 8) the breadth of the claims.

These factors are always applied against the background understanding that scope of enablement varies inversely with the degree of unpredictability involved. In re Fisher, 57 CCPA 1099, 1108, 427 F.2d 833, 839, 166 USPQ 18, 24 (1970). Keeping that in mind, the Wands factors have been considered and are relevant to the instant fact situation for the following reasons:

1. The nature of the invention, state and predictability of the art, and relative skill level

The invention relates to pesticidal material comprising a substantially water-immiscible core material and a microcapsule shell wall formed by interfacial polymerization of a polyisocyanate, a principal amine, and an auxiliary amine, wherein the microcapsule has a release rate which is characterized by a half-life ranging from about 5 days to about 100 days, as further defined in claim 1 (see claim 1). The relative skill of those in the art is high, that of a PhD. That factor is outweighed, however, by the unpredictable nature of the art of pesticidal microcapsules. As illustrative of the state of the art of pesticidal microcapsules, the examiner cites Seitz et al (US Patent 5,925,525) which shows half-lives ranging from a few hours to years, as evidenced by the Declaration by Becher filed 1/27/10 (e.g., see paragraphs 13-16). With respect to

microcapsules formed by reaction of a polyisocyanate with two amines, the Declaration by Becher additionally demonstrates that not all combinations of principal amine and auxiliary amine result in a microcapsule having a half-life ranging from about 5 days to about 100 days. The Declaration cites pages 29 and 30 of Applicant's response to the August 27, 2009 Final Office Action, and states that the half lives fall in a useful range over wide ranges of relative proportions (paragraph 13 of the Declaration). However, only three of the ten microcapsules formed actually have half lives falling within the range of 5 days to 100 days, i.e., Example 3F, wherein the ratio of TETA to MXDA is 20:80 (199.92 hours), Example 3E, wherein the ratio of TETA to MXDA is 30:70 (626.4 hours), and Example 3G, wherein the ratio of TETA to MXDA is 40:60 (179.08 hours). The remaining Examples all show half lives of less than 5 days, outside of the claimed range. Therefore, not all ratios of principal amine to auxiliary amine (in this case, TETA to MXDA) result in half lives within the claimed range. Furthermore, since there is unpredictability with regards to half lives of pesticidal microcapsules, it is not clear which other principal amines and auxiliary amines within the classes of amines named, and in what ratios, would result in half lives within the claimed range. Additionally, Applicant's specification teaches that certain amines will increase the permeability of the microcapsules, while other amines will decrease the permeability of the microcapsules (e.g., see page 7, lines 1-6 of the specification and Figures 1B and 2). It is not clear which amines falling within the broad classes now named in claim 1 will increase or decrease permeability, and to what degree, absent undue experimentation.

2. The breadth of the claims

The claims are very broad insofar as they recite any principal amine comprising a linear polyalkylamine or an epoxy-amine adduct and any auxiliary amine comprising an epoxy-amine adduct, a polyetheramine, or an amine comprising an aryl or cycloalkyl moiety, in any ratio, but do not give any specifics regarding what principal amine and auxiliary amine may be used, and in what ratios, in order to achieve a half-life ranging from about 5 days to about 100 days, with the exception of the specific principal and auxiliary amines and specific amounts which result in a half-life ranging from about 5 days to about 100 days, as noted above.

3. The amount of direction or guidance provided and the presence or absence of working examples

The specification provides no direction or guidance for what principal amine and auxiliary amine may be used, and in what ratios, in order to achieve a half-life ranging from about 5 days to about 100 days. While the data presented in the specification discusses trends regarding half-life, e.g., that half-lives decrease or increase as the amount of auxiliary amine involved in the polymerization is increased relative to the amount of principal amine, no reasonably specific guidance is provided for **selecting** a principal amine and auxiliary amine from within the named classes of compounds, in a specified ratio, in order to achieve a half-life ranging from about 5 days to about 100 days. The latter is corroborated by the working examples.

4. The quantity of experimentation necessary

Because of the known unpredictability of the art, and in the absence of experimental evidence commensurate with the claims, no one skilled in the art would

accept the assertion that the instantly claimed pesticidal materials, comprising principal amine and auxiliary amine in an unspecified ratio, could predictably have a half-life ranging from about 5 days to about 100 days as inferred by the claim. Accordingly, the instant claims do not comply with the enablement requirement of §112, since to practice the invention claimed in the patent a person of ordinary skill in the art would have to engage in undue experimentation, with no assurance of success.

Response to Arguments

11. Applicant's arguments filed 10/18/10 have been fully considered but they are not persuasive.

Applicants argue that, since the claims have been amended herein to specifically define the classes of amines that are auxiliary amines and principal amines, the breadth of the claims has thus been substantially narrowed (pages 26-27 of Applicant's Remarks filed 10/18/10). Applicants also argue that disclosures of trend data enable the ordinarily skilled person to readily select a variety of amine combination and ratios that result in microcapsules having a wide range of half lives, including the half life range of the claims, citing examples from the specification (pages 27-29 of Remarks). Applicants argue that case law clearly allows claims to cover non-enabled embodiments, even a very large number of inoperative embodiments, citing examples from case law (pages 29-31 of Remarks).

This argument is not persuasive. While the amendment to the claims is duly noted, the claims are still drawn to broad classes of compounds for each of the principal

amine and auxiliary amine. Additionally, no guidance is provided as to how one skilled in the art would select a principal amine and auxiliary amine from within the broad classes named in order to arrive at a half-life of from 5 days to 100 days. Furthermore, the claims are still drawn to any amount of principal amine and auxiliary amine, and thus are drawn to any ratio of auxiliary amine to principal amine. Since the data provided by Applicants demonstrates that one amine increases permeability while another decreases permeability, and that not all ratios of auxiliary amine to principal amine result in microcapsules having a half-life from 5 days to 100 days, and the specification provides no guidance as to how to select a particular auxiliary amine and principal amine from within the classes of amines named and how to select a particular ratio of auxiliary amine to principal amine, in order to arrive at a microcapsule having a half-life from 5 days to 100 days (aside from simply choosing each randomly and then testing them), one skilled in the art would not be enabled to select a particular auxiliary amine and principal amine from the classes of amines claimed, and a particular ratio, in order to arrive at microcapsules having the desired half-life, absent undue experimentation. Applicant's argument that the "trend data" resulted in microcapsules having a "wide range of half lives, including the half life range of the claims", and that case law allows for non-operative embodiments, is not persuasive because a "wide range of half lives, including the half life range of the claims" means microcapsules having half lives within the claimed range, and those that do not. While some non-operative embodiments may be present, in this case, the specification provides no guidance as to how to select principal amine, auxiliary amine, and ratio in order to arrive at the claimed half-life

range, expect for simply choosing any principal amine and auxiliary amine from the classes listed, and choosing any ratio of auxiliary amine to principal amine, and testing it, which amounts to undue experimentation.

Applicants also argue that a large quantity of experimentation is acceptable, and that "The Federal Circuit allows a considerable amount of experimentation so long as there is a reasonable amount of guidance" (pages 31-32 of Remarks), and that the Declaration of Becher establishes that the specification and examples provide sufficient guidance enabling the skilled person to make and use the claimed invention and that the experimentation necessary to make non-disclosed microcapsules having the claimed half life range is not undue (pages 32-36 of Remarks).

This argument is not persuasive because, as noted above, a reasonable amount of guidance is not provided in the instant specification. The individual examples of the specification show that some of the ratios of auxiliary amine to principal amine result in microcapsules having the claimed half-life range, and others which do not, and that some amines increase permeability, while others decrease permeability. The specification does not show that the individual examples provided would guide the skilled artisan to be enabled to use any auxiliary amine and principal amine from the broad classes named in any amount, given that some combinations decrease the permeability of the microcapsule while others increase it, and some ratios of auxiliary amine to principal amine result in microcapsules, having the claimed half-life range, while others do not.

In response to Applicant's arguments that a person having lower skill in the art could readily prepare microcapsules within the scope of the claims (page 37 of Remarks and paragraph 9 of Declaration), this argument is not persuasive because the data from the specification does not agree with this assertion, since some of the ratios of auxiliary amine to principal amine result in microcapsules having the claimed half-life range, and others which do not, and that some amines increase permeability, while others decrease permeability. The specification provides no guidance as to how to select principal amine, auxiliary amine, and ratio in order to arrive at the claimed half-life range, except for simply choosing any principal amine and auxiliary amine from the classes listed, and choosing any ratio of auxiliary amine to principal amine, and testing it, which amounts to undue experimentation.

In response to Applicant's argument regarding the unpredictability of the prior art (pages 37-38 of Remarks and paragraph 10 of Declaration), this argument is not persuasive since the prior art is unpredictable, as asserted by Applicants, and the instant specification does not result in predictability, but rather only provides individual examples of auxiliary amine, principal amine and ratios which result in claimed half life ranges but which do not represent the full scope of the claims, since other choices and amounts of auxiliary amine and principal amine result in microcapsules having half-lives outside of the claimed range. Therefore, the full scope of claims is still not enabled.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1-5, 9-12, 17-36, 40-43, 48-69, and 94-96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seitz et al (US Patent 5,925,595), alone or further in view of Becher et al (US Patent 4,563,212).

The claimed invention is drawn to a pesticidal material comprising a substantially water-immiscible core material, the core material comprising a pesticide and being encapsulated in a shell having a predetermined permeability with respect to the core material, wherein the core material is a single phase liquid at 50°C, the predominant release mechanism of core material from the microcapsule is molecular diffusion of the core material through the shell wall, further wherein the shell of the microcapsule is formed by an interfacial polymerization of a polyisocyanate with other monomers in an encapsulation shell-forming polymerization system, said other monomers comprising a principal amine and an auxiliary amine, and further wherein the microcapsule has a release rate which is characterized by a half-life ranging from about 5 days to about 100 days, the half- life being calculated from a measured release of pesticide over time from a population of microcapsules immersed in water at a temperature of about 30°C, and further wherein the auxiliary amine comprises an epoxy-amine adduct, a polyetheramine or an amine comprising a moiety selected from the group consisting of

an aryl moiety and a cycloalkyl moiety; and the principal amine comprises a linear polyalkylamine or an epoxy-amine adduct (see claim 1), and an agricultural formulation comprising a dispersion of microcapsules (which comprise the pesticidal material) in an aqueous phase (see claim 32).

Seitz et al teach a microencapsulated composition comprising a capsule wall that comprises the polymerization product of a triisocyanate, an aliphatic diisocyanate, and a polyamine, and an internal phase that comprises a first core chemical and a second core chemical (see claim 36). The triisocyanate Desmodur N3200 (the trifunctional biuret adduct of hexamethylene diisocyanate), the polyamine triethylene tetramine, and the core chemical alachlor (which is a single phase liquid at 50 °C) are exemplified (see Examples 1-4). Seitz et al also teach that varying the ratios of isocyanates used in the formation of the shell wall will lead to optimizing properties of the shell wall, such as permeability (for example, see col. 4, line 64 - col. 5, line 7). Seitz et al also teach that different polyamines are suitable in the polymerized shell wall product, including bis(hexamethylene)triamine, polyoxypropylenetriamines, amine epoxy adducts, and alkyl diamines (col. 8, lines 1-8). Seitz et al further teach that multifunctional isocyanates (i.e., di- and triisocyanates) are used in the polymerized shell wall product (for example, see columns 3 and 7). Release by molecular diffusion with half-lives of 74 days and 32 days are exemplified (Examples 16 and 17, column 16).

While Seitz et al suggest the use of several different polyamines in the microcapsule shell (col. 8, lines 1-5), Seitz et al do not specifically teach that an auxiliary amine is used with the polyisocyanates and principal amine to form the shell.

However, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to form the microencapsulated composition by the polymerization of polyisocyanate, a principal amine, and an auxiliary amine, with a reasonable expectation of success.

First, claims 1 and 32 as amended do not distinguish that the principal amine has to be different from the auxiliary amine. For example, both the principal amine and the auxiliary amine may be an epoxy-amine adduct; also, the auxiliary amine may be a polyetheramine, and the principal amine may be a polyalkylamine, which includes polyetheramines, as evidenced by Applicant's original disclosure (see page 15, lines 23-28 of the specification and original claim 11). Therefore, it would be within the purview of the skilled artisan to select one of the eight amines disclosed by Seitz (such as polyoxypropylenetriamines, or amine epoxy adducts) as both the principal amine and auxiliary amine by routine experimentation, since such a selection amounts to choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success, and since all of the named amines of Seitz et al are "expected to function adequately", as taught by Seitz.

Even if the principal amine and auxiliary amine are not the same, it is generally *prima facie* obvious to combine prior art elements according to known methods to yield predictable results. See MPEP 2141 III (A). Since Seitz et al teach that eight polyamines, including triethylene tetramine and polyoxypropylene triamine, would be expected to "function adequately" in the composition of Seitz et al., it would have been *prima facie* obvious to use more than one polyamine in the polymerization with the

polyisocyanates in order to form the microencapsulated composition, with a reasonable expectation of success.

Additionally, since Seitz et al teach that one of the polyurea shell wall components (i.e., the isocyanate) may be varied by using more than one isocyanate in specified ratios in order to improve the permeability of the shell wall, it would be obvious to one skilled in the art to also try varying the other component of the polyurea shell wall (i.e., the polyamine) by using more than one amine in specified ratios in order to improve the permeability of the shell wall. One skilled in the art would reasonably expect success from the use of more than one amine in forming the shell wall because multifunctional isocyanates are used in forming the shell wall, as taught by Seitz et al, and therefore would reasonably accommodate more than one amine.

Additionally or alternatively, one skilled in the art would find it obvious to use more than polyamine because the use of two polyamines in an interfacial polymerization with an isocyanate to form a polyurea shell wall to encapsulate a pesticide is already known.

Becher et al teach encapsulation by interfacial polycondensation to form a polyurea shell wall, wherein the first shell wall component is a diisocyanate, and the second shell wall component is a polyfunctional amine **or** a mixture of polyfunctional and difunctional amines (e.g., see claim 13). The active ingredient encapsulated may be an herbicide, such as alachlor (col. 4, line 41 and Examples).

Therefore, since the prior art of Becher et al teaches that either one amine **or** two amines may be reacted with an isocyanate by interfacial polymerization to encapsulate

an herbicide such as alachlor, one skilled in the art would find it obvious to use two amines taught by Seitz et al to form its microcapsules, with a reasonable expectation of success.

With respect to the agricultural formulation comprising a dispersion of microcapsules in an aqueous phase (claims 32-36, 40-43, and 48-69), Seitz et al. teach that an aqueous liquid is added to the combination of isocyanate and core chemical to form an oil-in-water emulsion before reacting the emulsion with a polyamine to form microcapsules which encapsulate the water-immiscible core chemical (see abstract). Therefore, the resultant microcapsules are dispersed in an aqueous liquid.

With respect to claims 2 and 33, the polyamines of Seitz et al. described above are not hydrolysis products of the polyisocyanate.

With respect to claims 3-5 and 34-36, the properties of predetermined and greater permeabilities would be present in the microcapsule and formulations of Seitz et al., given the fact that the microcapsule shell of Seitz et al. can be formed from the same components as those taught in the claimed invention.

With respect to claims 9, 22, 40, and 53, the properties relating to solubility would be present in the microcapsule and formulations of Seitz et al., given the fact that the microcapsule shell of Seitz et al. can be formed from the same components as those taught in the claimed invention.

With respect to claims 10-12, 17-18, 41-43, and 48-49, Seitz et al. teach that both triethylene tetramine and polyoxypropylene triamine are "expected to function adequately" in the microcapsule composition (col. 8, lines 1-5).

With respect to claims 19, 20, 50, and 51, Seitz et al. teach the use of Desmodur N3200 (the trifunctional biuret adduct of hexamethylene diisocyanate) as the triisocyanate (e.g., see Examples 1-4).

With respect to claims 21 and 52, the property of being "substantially non-porous" would be present in the shell of Seitz et al., given the fact that the microcapsule shell of Seitz et al. can be formed from the same components as those taught in the claimed invention.

With respect to claims 23-25 and 54-56, Seitz et al. teach that herbicides, such as the acetanilide alachlor, are particularly preferred core materials (col. 8, lines 20-22).

With respect to claims 26 and 57, Seitz et al. teach that "in one preferred embodiment, the core contains both a herbicide and a safener" (col. 8, lines 26-27).

With respect to claims 27-29 and 58-60, Seitz et al. teach that the core chemical can optionally have combined with it a hydrophobic diluent (col. 3, lines 53-54). Seitz et al. further teach that the chemical nature and the amount of core diluent used determines its effect on the release, stating that a poor solvent will decrease the release, and a good solvent will accelerate the release (col. 5, lines 29-37). Therefore, the addition of the diluent may affect the solubility parameters of the core material as disclosed in the claimed invention.

With respect to claims 30 and 61, Seitz et al. teach a wall to core ratio of 8% (e.g., see Examples 13 and 14); this is encompassed by Applicant's shell to core ratio of less than 33%.

With respect to claims 31, 62, 65, and 68, Seitz et al. teach a wall to core ratio of 8%, and an average size of 3 microns (Examples 13 and 14). Based on these measurements, the microcapsule would have a mass to volume ratio and a volumetric diameter distribution within the measurements of the claimed invention.

With respect to claim 63, the property of the viscosity of the dispersion of Seitz et al. would necessarily be encompassed by the viscosity ranges of the formulation of the claimed invention, given the fact that the size and weight of the shell and core of Seitz et al. are encompassed within the size and weight ranges of the claimed invention.

With respect to claim 64, Seitz et al. teach that the capsules have a particle size ranging from 2.2 to 4.5 microns (see Examples); this is encompassed by Applicant's range of 2 to 8 microns.

With respect to claim 66, Seitz et al. teach in Example 1 that the weight of the core and shell is 408.9 grams, and the total weight is 732.7 grams; therefore the weight percent of the capsule is 56% (see Example 1); this is encompassed by Applicant's range of less than 65 weight percent microcapsules.

With respect to claim 67, Seitz et al. teach that a preservative may be added to the formulation (col. 9, lines 29-30).

With respect to claim 69, Seitz et al. applying the formulation to agricultural fields of rox orange sorghum and barnyardgrass (e.g., see Example 15, column 13) and Dekalb corn hybrids (e.g., see Example 21, column 21).

With respect to claims 94 and 95, Seitz et al. exemplify release by molecular diffusion with half-lives of 74 days and 32 days (Examples 16 and 17, column 16).

With respect to claim 96, the polyamine triethylene tetramine is exemplified (see Examples 1-6) and polyoxypropylenetriamines are also expected to function adequately (col. 8, lines 1-5).

Response to Arguments and Declaration

14. Applicant's arguments filed 10/18/10 and the accompanying Declaration by Becher of the same date have been fully considered but they are not persuasive for overcoming the rejection.

Applicants argue that Seitz et al. do not disclose or suggest using more than one amine to prepare their microencapsulated pesticide, and a statement that the amines that Seitz et al. suggest using are "expected to function adequately" is not a disclosure or suggestion of multiplying the number of amine species (pages 39-41 of Applicant's Remarks filed 10/18/10). Applicants argue that Seitz did suggest other components that may be multiplied, but contained no language that suggests multiplication of polyamine species, and therefore the prior does not include "each element claimed" (pages 52-55 of Remarks and paragraphs 14-17 of Declaration).

This argument is not persuasive. It is first noted that the classes of amines now recited in amended claims 1 and 32 overlap, such that the auxiliary amine need not be different from the principal amine. For example, both the principal amine and the auxiliary amine may be an epoxy-amine adduct; also, the auxiliary amine may be a polyetheramine, and the principal amine may be a polyalkylamine, which includes polyetheramines, as evidenced by Applicant's original disclosure (see page 15, lines 23-

28 of the specification and original claim 11). Therefore, it would be within the purview of the skilled artisan to select one of the eight amines disclosed by Seitz (such as polyoxypropylenetriamines, or amine epoxy adducts) as both the principal amine and auxiliary amine by routine experimentation, since such a selection amounts to choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success, and since all of the named amines of Seitz et al are "expected to function adequately", as taught by Seitz. Even if different amines were required, one skilled in the art would find it obvious to use more than one amine, since Seitz et al teach that other components may be varied in order to improve the permeability of the shell wall, and therefore one skilled in the art would also find it obvious to try using more than one amine in order to improve the permeability. That Seitz did not specifically state that more than one polyamine could be used does not constitute a teaching against it. Additionally, the use of more than one amine in an interfacial polymerization with an isocyanate to encapsulate a pesticide is already known, as taught by Becher et al, and therefore one skilled in the art would find it obvious to use more than one amine with the composition of Seitz et al.

In response to Applicant's argument that Becher does not disclose a mixture of amines (pages 41-42 and 55-56 of Remarks and paragraph 18 of Becher Declaration), this argument is not persuasive because Becher clearly teaches a single amine or mixture of amines may be reacted with a polyisocyanate (e.g., see col. 6, lines 24-27 and claim 13), and thus one skilled in the art would find it obvious to use more than one

amine with the composition of Seitz et al. Becher need not teach the specific amines of the claimed invention, since this is already taught by Seitz.

In response to Applicant's arguments against the obviousness rejection based on the accompanying enablement rejection (pages 42-44 of Remarks), this argument is not persuasive because the obviousness rejection has a different basis than the enablement rejection. The obviousness rejection is based on the fact that one skilled in the art would find it obvious to select more than one of the eight amines taught by Seitz to be reacted with the mixture of isocyanates, with a reasonable expectation of success, for reasons stated above (see paragraph 13, above). On the other hand, the scope of enablement rejection is based on the fact that one skilled in the art would not be enabled to make and use the invention commensurate in scope with the claims, that is, to select any principal amine and any auxiliary amine from the classes of named amines, in any amount, and arrive at the claimed half life range, for reasons stated above (see paragraph 10, above).

In response to Applicant's arguments regarding the deficiencies of the Seitz et al disclosure and the data therein (pages 47-51 of Remarks and paragraphs 10-13 of Declaration), this argument is not persuasive because Applicants are not making a direct comparison, since Applicants have not reproduced their data in the same manner as Seitz, i.e., if Applicants were to represent their data as they did the Seitz data, with minor variations in the formulation (e.g., the use of a thickener), would they achieve the same or different results? Since no such data is presented, it cannot be conclusively determined that the data of the claimed invention is more reproducible than the data of

Seitz. On the contrary, when Seitz varies the blend of isocyanates in the same manner that the claimed invention varies the blend of polyamines, the resulting trend, as graphed by Seitz, follows the same trend as that of the claimed invention (compare Figure 1 of Seitz with Figure 1A of the claimed invention).

In response to Applicant's argument that the ordinarily skilled person could not have recognized or predicted the advantageous results of the present invention in terms of control of half lives that is enabled by using the amines defined by the claims to prepare the microcapsules (pages 44-47 and 51 of Remarks), this argument is not persuasive because more than one amine is not required in the claims as currently written, since the principal amine and auxiliary amine may be the same, and because, even if the amines are different, one skilled in the art would find it obvious to use more than one amine for reasons stated above. Furthermore, since Seitz teaches that using more than one of the other components (i.e., the isocyanate) controls the half-life of the resulting microcapsules (e.g., see Figure 1 of Seitz), one skilled in the art would reasonably expect that varying the number and amount of the other component used (i.e., the amine) would also control the half-life of the microcapsules.

In response to Applicant's arguments regarding the Hildebrand solubility parameters of the core material and shell (page 56 of Remarks), this argument is not persuasive because the properties relating to solubility would be present in the microcapsule and formulations of Seitz et al., given the fact that the microcapsule shell of Seitz et al. can be formed from the same components as those taught in the claimed invention.

Therefore, it is the Examiner's position that the claims are rendered obvious.

Claim Objections

15. **Claims 11 and 42 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.** Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 11 and 42 both recite the limitation wherein the auxiliary amine is the polyetheramine (line 3 of claim 11 and line 3 of claim 42). However, claim 10 (from which claim 11 depends) and claim 41 (from which claim 42 depends) both recite the limitation wherein the auxiliary amine is the epoxy-amine adduct, which is a different embodiment from the polyetheramine (compare with lines 17-18 of claim 1). Therefore, claims 11 and 42 fail to further limit claims 10 and 41, respectively.
16. Claims 11 and 42 are also objected to because of the following informalities: claims 11 and 42 depend from claims 10 and 41, respectively, which are now withdrawn. Appropriate correction is required.

Conclusion

No claims are allowed at this time.

17. **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BARBARA FRAZIER whose telephone number is (571)270-3496. The examiner can normally be reached on Monday-Thursday 9am-4pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sharmila Landau can be reached on (571)272-0614. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BSF

/Ashwin Mehta/
Primary Examiner, Technology Center 1600